

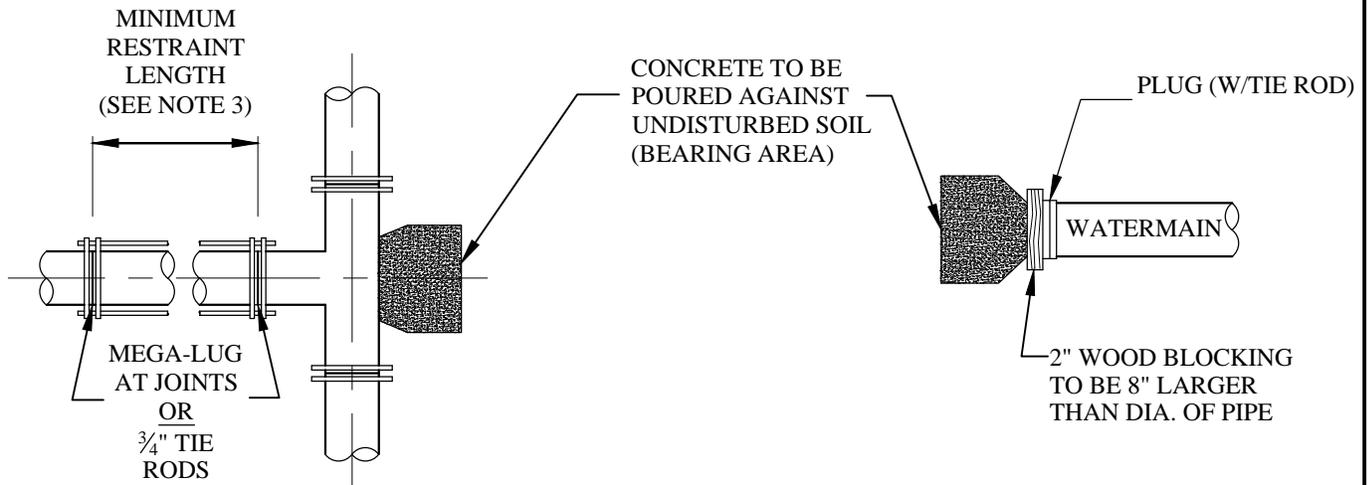
MINIMUM PIPE RESTRAINT LENGTHS (NO THRUST BLOCKING)

PIPE SIZE	PLUG	90° BEND OR TEE*	45° BEND**	22½° BEND**
6"	47'	17'	7'	4'
8"	62'	22'	9'	5'
10"	75'	26'	11'	5'
12"	88'	30'	13'	6'
16"	114'	39'	16'	8'
20"	139'	47'	20'	10'
24"	164'	55'	23'	11'
30"	199'	66'	28'	14'
36"	233'	77'	32'	16'
42"	265'	87'	36'	18'
48"	296'	96'	40'	20'

* RESTRAINING ALONG SINGLE LEG OF TEE.
 ** LENGTH IS BOTH DIRECTIONS FROM BEND.

MINIMUM BEARING AREAS (FOR THRUST BLOCKING)

PIPE SIZE	TEE or PLUG	90° BEND	45° BEND	22½° BEND
6"	2.9 SQ. FT.	3.1 SQ. FT.	1.6 SQ. FT.	0.8 SQ. FT.
8"	3.7 SQ. FT.	5.3 SQ. FT.	2.9 SQ. FT.	1.4 SQ. FT.
10"	5.7 SQ. FT.	8.1 SQ. FT.	4.4 SQ. FT.	2.2 SQ. FT.
12"	8.1 SQ. FT.	13.4 SQ. FT.	6.6 SQ. FT.	3.2 SQ. FT.
16"	15.1 SQ. FT.	21.4 SQ. FT.	11.6 SQ. FT.	5.9 SQ. FT.
20"	23.2 SQ. FT.	30.2 SQ. FT.	18.1 SQ. FT.	9.3 SQ. FT.
24"	33.6 SQ. FT.	48.5 SQ. FT.	26.1 SQ. FT.	13.3 SQ. FT.
OVER 24"	PIPE WILL BE RESTRAINED. SEE TABLE ABOVE			



NOTES:

1. PIPE RESTRAINING OR THRUST BLOCKING WILL BE USED FOR PLUGS, TEES, AND BENDS 22 ½° AND OVER.
2. PIPE RESTRAINING AS NOTED IN THE TABLE MAY BE USED IN LIEU OF THRUST BLOCKING AT THE CONTRACTOR'S DISCRETION.
3. IF NEXT JOINT BEYOND FITTING IS BEYOND RESTRAINT LENGTH, NO RESTRAINTS ARE NECESSARY.
4. PIPE RESTRAINING WILL BE ACCOMPLISHED THROUGH USE OF GALVANIZED TIE-RODS (¾" MINIMUM) OR MEGA-LUG FITTINGS, OR ENGINEER APPROVED EQUAL.
5. THRUST BLOCK WILL ONLY BE USED WHERE WORKING PRESSURES ARE 150 PSI OR LESS.
6. THRUST BLOCK BEARING AREA WILL BE PLACED AGAINST UNDISTURBED TRENCH AREA OR MATERIAL AS DIRECTED BY THE ENGINEER.
7. NO TIMBER WILL BE ALLOWED AS AN ALTERNATE TO CONCRETE FOR THRUST BLOCKING.
8. WRAP FITTINGS WITH POLYETHYLENE PRIOR TO PLACING CONCRETE FOR THRUST BLOCKING.



CITY OF BURNSVILLE - ENGINEERING DEPT.

**WATERMAIN RESTRAINT
& THRUST BLOCKING**

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